

ABSTRACT

In a thin film transistor (1), a gate insulating layer (4) is formed on a gate electrode (3) formed on an insulating substrate (2). Formed on the gate insulating layer (4) is a semiconductor layer (5). Formed on the semiconductor layer (5) are a source electrode (6) and a drain electrode (7). A protective layer (8) covers them, so that the semiconductor layer (5) is blocked from an atmosphere. The semiconductor layer (5) (active layer) is made of, e.g., a semiconductor containing polycrystalline ZnO to which, e.g., a group V element is added. The protective layer (8) thus formed causes decrease of a surface level of the semiconductor layer (5). This eliminates a depletion layer spreading therewithin. Accordingly, the ZnO becomes an n-type semiconductor indicating an intrinsic resistance, with the result that too many free electrons are generated. However, the added element works on the ZnO as an acceptor impurity, so that the free electrons are reduced. This decreases a gate voltage required for removal of the free electrons, so that the threshold voltage of the thin film transistor (1) becomes on the order of 0V. This allows practical use of a semiconductor device which has an active layer made of zinc oxide and which includes an protective layer for blocking the active layer from an atmosphere.